

Yuqiang Alan Zhang

Research Scientist

Duke University, Nicholas School of the Environment, Earth and Ocean Science,
Environment Hall #5112, 9 Circuit Dr, Durham, NC 27710

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RESEARCH INTERESTS

Interactions between climate changes, air quality and human health; Co-benefits of global and regional climate policy on air quality and human health; Urban heat island mitigation and green infrastructure; Intercontinental air transport; Dynamically downscaling of global climate changes

Personal website: <https://yuqiangzhang.wordpress.com/>

Google scholar profile:

<http://scholar.google.com/citations?user=A40cvyqAAAAJ&hl=en>

EDUCATION

2016.01 Ph.D.	Environmental Science and Engineering	UNC-CH, USA
2011.06 M.S.	Environmental Science and Engineering	Tsinghua University, China
2008.06 B.S.	Environmental Science and Engineering	Shandong University, China

WORK EXPERIENCES

Duke University, Research Scientist,	2018.02—till now
Duke University, Project Manager for Duke MIDS program	2020.09—2021.05
US Environmental Protection Agency, ORISE Fellow,	2016.04—2018.02
University of North Carolina at Chapel Hill, Postdoctoral research,	2016.03—2016.04

PUBLICATIONS (citation >1400 from GS; *Corresponding author)

Till June 1st: **28** published/accepted peer-review articles; h-Index 11 and i10-Index of 11.

28). Shindell, D., Kuylenstierna, J., Ravishankara, A.R., Michalopoulou, E., Höglund-Isaksson, L., **Zhang, Y.**, et al. United Nations Environment Programme and Climate and Clean Air Coalition. Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions, ISBN: 978-92-807-3854-4. (2021).

Press Release: [AP](#), [AFP](#), [Axios](#), [BBC](#), [BBC \(TV\)](#), [CNBC](#), [E&E](#), [Financial Times](#), [HuffPost \(Fr\)](#), [Independent](#), [NY Times](#), [Mirage News](#), [Radio Canada International](#), [Reuters](#), [Sky](#), [The Conversation \(Drew Q&A\)](#), [The Guardian](#), [The Hill](#), [The Verge](#), [Washington Examiner](#),

27). **Zhang, Y***, Shindell, D., Seltzer, K., Shen, L., Lamarque, J.-F., Zhang, Q., Zheng, B., Xing, J., Jiang, Z., and Zhang, L.: Impacts of emission changes in China from 2010 to 2017 on domestic and intercontinental air quality and health effect, *Atmos. Chem. Phys. Discuss.* [preprint], <https://doi.org/10.5194/acp-2021-385>, in review, 2021.

26). Tang, T., Shindell, D., **Zhang, Y.**, Voulgarakis, A., Lamarque, J.-F., Myhre, G., Faluvegi, G., Samset, B., Andrews, T., Olivie, D., Takemura, T., and Lee, X.: Distinct surface response to black carbon aerosols, *Atmos. Chem. Phys. Discuss.* [preprint], <https://doi.org/10.5194/acp-2021-186>, in review, 2021.

- 25). **Zhang Y***, Shindell, D.: Costs from labor losses due to extreme heat in the United States attributable to climate change, *Climatic Change* 164, 35 (2021).
<https://doi.org/10.1007/s10584-021-03014-2>
- 24). Jiang, Z., Shi, H., Zhao, B., Gu, Y., Zhu, Y., Miyazaki, K., Lu, X., Zhang, Y., Bowman, K. W., Sekiya, T., and Liou, K.-N.: Modeling the impact of COVID-19 on air quality in southern California: implications for future control policies, *Atmos. Chem. Phys.*, 21, 8693–8708, <https://doi.org/10.5194/acp-21-8693-2021>, 2021.
- 23). Liu, S., Xing, J., Westervelt, D. M., Liu, S., Ding, D., Fiore, A. M., Kinney, P. L., **Zhang, Y.**, He, M. Z., Zhang, H., Sahu, S. K., Zhang, F., Zhao, B. and Wang, S.: Role of emission controls in reducing the 2050 climate change penalty for, *Sci. Total Environ.*, 765, 144338, [doi:10.1016/j.scitotenv.2020.144338](https://doi.org/10.1016/j.scitotenv.2020.144338), 2021.
- 22). **Zhang, Y***, West, J. J., Emmons, L. K., Flemming, J., Jonson, J. E., Lund, M. T., et al. Contributions of World Regions to the Global Tropospheric Ozone Burden Change from 1980 to 2010. *Geophysical Research Letters*, 48, e2020GL089184, 2020.
- 21). Miyazaki, K., Bowman, K., Sekiya, T., Jiang Z., Chen, X., Eskes, H., Ru, M., **Zhang, Y.**, Shindell, D.: Air quality response in China linked to the 2019 novel Coronavirus (COVID-19) Mitigation, *Geophysical Research Letters*, 47, e2020GL089252, 2020.
- 20). Xing, J., Lu, X., Wang, S., Wang, T., Ding, D., Yu, S., Shindell, D., Ou, Y., Morawska, L., Li, S., Ren, L., **Zhang, Y.**, Loughlin, D., Zheng, H., Zhao, B., Liu, S., Smith, K. R. and Hao, J.: The quest for improved air quality may push China to continue its CO₂ reduction beyond the Paris Commitment, *Proc. Natl. Acad. Sci.*, (June), [doi:10.1073/pnas.2013297117](https://doi.org/10.1073/pnas.2013297117), 2020.
- 19). Xie, Y., Wu, Y., Li, B., Xie, M., Zhang, H and **Zhang, Y***. Health and economic Benefit of China's greenhouse gas mitigation by 2050, *Environ. Res. Lett.*, <https://doi.org/10.1088/1748-9326/aba97b>, 2020.
- 18). Shindell, D., **Zhang, Y.**, Scott, M., Ru, M., Stark, K., & Ebi, K. L.: The Effects of Heat Exposure on Human Mortality Throughout the US. *GeoHealth*, 4, e2019GH000234. <https://doi.org/10.1029/2019GH000234>, 2020.
- 17). **Zhang, Y***, Bash, J. O., Roselle, S. J., Shatas, A., Repinsky, A., Mathur, R., Hogrefe, C., Piziali, J., Jacobs, T. and Gilliland, A.: Unexpected air quality impacts from implementation of green infrastructure in urban environments: A Kansas City case study, *Sci. Total Environ.*, 744, [doi:10.1016/j.scitotenv.2020.140960](https://doi.org/10.1016/j.scitotenv.2020.140960), 2020.
- 16). Tang, T., Shindell, D., **Zhang, Y.**, Voulgarakis, A., Lamarque, J.-F., Myhre, G., Stjern, C. W., Faluvegi, G., and Samset, B. H. (2020) Response of shortwave cloud radiative effect to greenhouse gases and aerosols and its impact on daily maximum temperature, *Atmos. Chem. Phys.*, 20, 8251–8266, <https://doi.org/10.5194/acp-20-8251-2020>, 2020.
- 15). **Zhang Y.**, Kristen M. Foley, Jesse O. Bash, Donna B. Schwede, Robin L. Dennis, and Joseph P. Pinto. A Measurement-Model Fusion Approach for Improved Wet Deposition Maps and Trends, *JGR-Atmospheres*, <https://doi.org/10.1029/2018JD029051>,
- 14). Jin. X., Fiore. A., Civerolo. K., Johnson. S., Bi. J., Liu. Y., van Donkelaar. A., Martin, R.,

- Al-Hamdan, M., **Zhang Y.**, Insaf, T., Kioumourtzoglou, M., He, M., Kinney, P.: Quantifying health benefits of emission reduction over New York State using multiple PM_{2.5} products, *Environ. Res. Lett.*, <https://doi.org/10.1088/1748-9326/ab2dcb>, 2019.
Press release: [ScienceDaily](#), [NewBeezer](#)
- 13). Wu, Z., **Zhang, Y.**, Zhang, L., Huang, M., Zhong, L., Chen, D., Wang, X.: Trends of outdoor air pollution and the impact on premature mortality in the Pearl River Delta region of southern China during 2006–2015. *Science of The Total Environment*, 690, 248-260, [DOI:10.1016/j.scitotenv.2019.06.401](https://doi.org/10.1016/j.scitotenv.2019.06.401), 2019.
- 12). **Zhang, Y***, Mathur, R., Bash, J. O., Hogrefe, C., Xing, J., and Roselle, S. J.: Long-term trends in total inorganic nitrogen and sulfur deposition in the US from 1990 to 2010, *Atmos. Chem. Phys.*, 18, 9091-9106 <https://www.atmos-chem-phys.net/18/9091/2018/>, 2018.
- 11). **Zhang, Y***, West, J. J., Mathur, R., Xing, J., Hogrefe, C., Roselle, S. J., Bash, J. O., Pleim, J. E., Gan, C.-M., and Wong, D. C.: Long-term trends in the PM_{2.5}- and O₃-related mortality burdens in the United States under emission reductions from 1990 to 2010, *Atmos. Chem. Phys.*, <https://www.atmos-chem-phys.net/18/15003/2018/>, 2018.
Press release: [NY Times](#), [UNC](#), [EurekAlert](#), [Phys. WUWT](#),
- 10). **Zhang, Y.**, Smith, S., Bowden, J., Adelman, Z., West, J. J.: Co-benefits of global, domestic, and sectoral greenhouse gas mitigation for US air quality and human health in 2050, *Environ. Res. Lett.*, <https://doi.org/10.1088/1748-9326/aa8f76>, 2017.
Press release: [Phys](#), [NewsWeek](#), [ScienceDaily](#), [LiveScience](#)
- 9). Xing, J., Wang, J., Mathur, R., Wang, S., Sarwar, G., Pleim, J., Hogrefe, C., **Zhang, Y.**, Jiang, J., Wong, W. and Hao, J.: Impacts of aerosol direct effects on tropospheric ozone through changes in atmospheric dynamics and photolysis rates, *Atmos. Chem. Phys.*, [doi: 10.5194/acp-17-9869-2017](https://doi.org/10.5194/acp-17-9869-2017), 2017.
- 8). West, J. J., **Y. Zhang**, S. Smith, R. Silva, J. Bowden, V. Naik, Y. Li, D. Gilfillan, Z. Adelman, M. Fry, S. Anenberg, L. W. Horowitz, and J.-F. Lamarque.: Cobenefits of global and domestic greenhouse gas emissions for air quality and human health, *The Lancet*, [http://dx.doi.org/10.1016/S0140-6736\(17\)31135-2](http://dx.doi.org/10.1016/S0140-6736(17)31135-2), 2017.
Press release: [CBC](#), [ScienceDaily](#), [Yahoo News](#), [Phys](#)
- 7). **Zhang, Y.**, Cooper, O., Gaudel, A., Thompson, A. M., Nédélec, P., Ogino, S. Y., West, J. J.: Tropospheric ozone change from 1980 to 2010 dominated by equatorward redistribution of emissions, *Nature Geosci.*, [doi:10.1038/ngeo2827](https://doi.org/10.1038/ngeo2827), 2016.
- 6). **Zhang, Y.**, Bowden, J., Adelman, Z., Naik, V., Horowitz, L. W., Smith, S. J., West, J. J. Co-benefits of global and regional greenhouse gas mitigation on U.S. air quality in 2050, *Atmos. Chem. Phys.*, 16, 9533-9548, [doi:10.5194/acp-16-9533-2016](https://doi.org/10.5194/acp-16-9533-2016), 2016.
- 5). West, J. J., Smith S. J., R. Silva A., Naik V., **Zhang Y.**, Adelman Z., Fry M. M., Anenberg S., Horowitz L. W., and Lamarque J.-F.: Co-benefits of global greenhouse gas mitigation for future air quality and human health, *Nat. Clim. Chang.*, 3, 885-889, [doi:10.1038/NCLIMATE2009](https://doi.org/10.1038/NCLIMATE2009), 2013. (#citation 438 from GS)
- 4). Silva, R. A., West J. J., **Zhang Y.**, Anenberg S. C., Lamarque J.-F., Shindell D. T., Bergmann D., Berntsen T. K., Cameron-Smith P., Collins W. J., Ghan S. J., Josse B.,

Nagashima T., Naik V., Plummer D., Rodriguez J. M., Szopa S., and Zeng G.:
Global premature mortality due to anthropogenic outdoor air pollution and the contribution
of past climate change, *Environ. Res. Lett.*, 8, 034005, [doi:10.1088/1748-9326/8/3/034005](https://doi.org/10.1088/1748-9326/8/3/034005), 2013. (#citation 385)

Featured in NASA Image of the day, Sep 18, 2013:

<https://earthobservatory.nasa.gov/images/82087/the-global-toll-of-fine-particulate-matter>

- 3). Wang, Y., **Zhang, Y.**, Hao, J., and Luo, M.: Seasonal and spatial variability of surface ozone over China: contributions from background and domestic pollution, *Atmos. Chem. Phys.*, 11, 3511-3525, <https://doi.org/10.5194/acp-11-3511-2011>, 2011.
- 2). Wang, Y. X., Hao, J. M., Mcelroy, M. B., William, J. Munger., Ma, H., Nielsen, C. P. and **Zhang, Y.Q.**: Year round measurements of O₃ and CO at a rural site near Beijing: variations in their correlations, *Tellus*, 62B, 228–241, [doi: 10.1111/j.1600-0889.2010.00464.x](https://doi.org/10.1111/j.1600-0889.2010.00464.x), 2010.
- 1). Wang, Y. X., **Zhang, Y.Q.**, and Hao, J. M.: Review on the applications of Tropospheric Emissions Spectrometer to air quality research: perspectives for China, *Front. Environ. Sci. Engin. China*, 4(1), 12-19, doi: 10.1007/s11783-010-0012-9, 2010.

Under Review (*Corresponding author)

- 36) Wang et al., Constituents of fine particulate matter and asthma in six low- and middle-income countries (under review *European Respiratory Journal*)
- 35) **Zhang, Y.** et al., Non-negligible contributions on human health from increased household air pollution exposure during COVID19 lockdown in China (in revision *Env. Int.*)
- 34) Li, D., Shindell, D., Lu, X., Zhang, L., and **Zhang, Y*.**: Surface Ozone Change on Crop Yield in China from 2010 to 2017 (submitted to *Atmos. Chem. Phys.*,)
- 33) Shindell, D., Ru, M., **Zhang, Y.**, Seltzer, K et al., The Temporal and Spatial Distribution of Health, Labor and Agriculture Benefits of Climate Change Mitigation in the US (in revision *PNAS*)
- 32) He C. et al., Urban adaptation strategies avoid labor loss from the risk of future urban Warming (under review in *PNAS*)
- 31) Wang Y., Xie Y., Wu Y., Xie M., Wang M., Zhang X. and **Zhang Y.**: Co-benefits of ozone reduction from China's Climate Policy by 2050 (under review *Env. Pollu.*)
- 30) Huang, S., Song, S., Nielsen, C., **Zhang, Y.**, Zhang, Y., Xiong, J., Wescheler, L., Xie, S., Li, J., Residential building materials is an important source of ambient formaldehyde in mainland China (under review *Nat. Comm.*)
- 29) L. A. Parsons, D. Shindell, M. Tigchelaar, **Y. Zhang**, J. Spector: Climate Change Impacts on Labor and Ability of Workers to Adapt to Warming (in preparation for *NCC*)

GRANTS

Funded, submitted at Duke Univ.

Duke University Master in Interdisciplinary Data Science project manager, **Budget, 5000\$**

Not Funded, submitted at Duke Univ.

Source: NASA NIP

submitted in 09/2020

Title: “Quantify the contributions of unexceptional sources on the trends of U.S. air quality and related health effects from 2000 to 2020 using satellite assimilation techniques

Role: New Principle Investigator

Budget: \$383,235

Source: NOAA AC4

submitted in 08/2020

Title: “Effects of heat island mitigation strategies on air quality- and temperature-related health impacts in New York City”

Role: Principle Investigator

Budget: \$299,952

Source: NASA HAQST

submitted in 06/2020

Title: “Satellite data analysis of the impact of emission changes in China from 2010 to 2019 on global air quality, human health and radiative forcing”

Role: Principle Investigator

Budget: \$505,807

Source: NASA RRNES

submitted in 06/2020

Title: “Satellite constrained data to investigate residential sector contributions to ambient and indoor air pollution and health in United States, India and China during COVID-19”

Role: Principle Investigator

Budget: \$99,825

Source: HEI RFA 18-1

Submitted, 02/2019

Title: “Source apportionment of recent air quality improvement and mortality burden decreases in the United States from 1990 to 2016”

Role: Principle Investigator

INVITED TALKS & SEMINARS

- 17) 03/2021, invited talk at Duke University Program in Ecology (virtual), Zhang Y. et al., “*Unexpected air quality impacts from the implementation of green infrastructure*”
- 16) 06/2020, invited talk at Symposium on Atmospheric Environment Monitoring and Simulation (virtual), Zhang Y. et al., “*Global and Regional ozone changes from 1980*”
- 15) 11/2019, invited talk at Emory University, GA, Zhang Y. et al.: “*Using Global and Regional Models to Assess Air Quality and Health under Changing Climate*”
- 14) 06/2019, invited speaker at the “2019 workshop on co-benefits of sustainable energy transition in China” at Tsinghua University, Beijing, China, Zhang Y. et al.: “*Recent China Clean Air Actions on Global Air Quality and Climate Change*”.
- 13) 05/2019, invited talk at the Department of Economics and Management at Beihang University, Beijing, China: Zhang Y. et al.: “*Recent China Clean Air Actions on Global Air Quality and Climate Change*”.
- 12) 05/2019, invited speaker at the 7th Air Benefit and Cost and Attainment Assessment Conference (ABaCAS 2019), Zhang Y. et al.: “*Recent China Clean Air Actions on Global Air Quality and Climate Change*”.
- 11) 12/2018, invited speaker at the 2018 “2nd International Forum on Climate Change and Health” in Guangzhou, China, Zhang Y. et al.: “*Co-benefits of Global and Regional GHGs Mitigation on Global and Regional Air Quality and Human Health*”.

- 10) 05/2018, invited speaker at the 2018 joint international conference on ABaCAS and CMAS-Asia-Pacific, Zhang Y. et al: "*Significantly reduced health burden from ambient air pollution in the United States under emission reductions from 1990 to 2016*".
- 9) 12/2017, invited speaker at the 2017 AGU Union session, Zhang Y. et al: "*Significantly Reduced Health Burden from Ambient Air Pollution in the United States under Emission Reductions from 1990 to 2016*".
- 8) 11/2017, Invited talk at Tsinghua University, Beijing, China, Zhang Y. et al: "*Significantly Reduced Health Burden from Ambient Air Pollution in the United States under Emission Reductions from 1990 to 2010*".
- 7) 11/2017, Invited talk at China Ocean University, Shandong, China, Zhang Y. et al: "*Equatorward Redistribution of Emissions Dominates the Tropospheric Ozone Change, 1980-2010*".
- 6) 11/2017, Invited talk at Shandong University, Shandong, China, Zhang Y. et al: "*Equatorward Redistribution of Emissions Dominates the Tropospheric Ozone Change, 1980-2010*".
- 5) 11/2017, invited talk at Jinan University, Guangzhou, China, Zhang Y. et al: "*Equatorward Redistribution of Emissions Dominates the Tropospheric Ozone Change, 1980-2010*".
- 4) 10/2017, invited talk on the US EPA Air Climate and Energy connection program "*Moment of Science*", Zhang et al: "*Significantly Reduced Health Burden from Ambient Air Pollution in the U.S. Under Emission Reductions from 1990 to 2010*".
- 3) 03/2017, invited talk by UNC-CH Group on Atmospheric Science & Pollution Zhang Y. et al: "*Significantly reduced health burdens from ambient air pollution in the US under emission reductions from 1990 to 2010*".
- 2) 02/2016, invited talk by China Project, Harvard Paulson School of Engineering and Applied Sciences, Zhang Y. et al: "*Co-benefits of Global Greenhouse Gas Mitigation for US Air Quality and Human Health through Dynamical Downscaling: the application in China*".
- 1) 01/2016, invited talk at Tsinghua University, Zhang Y. et al: "*Application of Chemical Transport Models to Study Global and Regional Air Quality and Human Health*".

TEACHING EXPERIENCES

Guest Lecturer

1. BIOL 311/ENVIOR 311 Biogeochemistry (Undergraduate level)
Duke Kunshan University, Fall, 2020; 2021 Spring
2. EOS 355 — Global Warming (Undergraduate level)
Nicholas School of Environment, Duke University, Spring, 2020;
3. ENVR 600 — Environmental Health (Graduate level)
Gillings School of Global Public Health, University of North Carolina at Chapel Hill; Spring 2014;

Teaching Assistant

2. ENVR 600 — Environmental Health (Graduate level)
Gillings School of Global Public Health, University of North Carolina at Chapel Hill; Fall 2013;
1. ENVR 468 — Advanced Functions of Temporal GIS (Graduate level)

Gillings School of Global Public Health, University of North Carolina at Chapel Hill; Fall 2013;

COMMUNITY SERVICES

Journal Reviewer for > 100 articles, including but not limited to *Nat. Clim. Change*, *Nat. Comms.*, *The Lancet Planetary Health*, *Atmos. Chem. Phys.*, *Environ. Sci. Technol.*, *Environmental International*, *Geophys. Res. Lett.*, *Environ. Res. Lett.*, *Atmos. Environ* and so on.

Panel review for 2020 NASA Postdoctoral program

Proposal & Panel review for NASA FINESST 2019

Primary & Co-convener for 2020 AGU Fall Meeting “*Global Environmental Change*” and “*Atmospheric Sciences*” session

Expert Reviewer for the Second Order Draft (SOD) of the Working Group I (WGI) contribution to the Sixth Assessment Report (AR6), 2020

Co-host (2 in total) the NOAA’s 44th Climate Diagnostics and Prediction Workshop in 2019

Executive committee for the International Conference on Air Benefits and Cost and Attainment Assessment, 2018-2020

Organizing committee for the 5th Chinese Environmental Scholars Forum in Duke University, NC, May 19-20, 2018;

Special issue editor for *Atmosphere* “*Air Quality Management*” till May, 2021

Session chair for the NOAA’s 44th Climate Diagnostics and Prediction Workshop in 2019

Session chair for the 7th International Conference on Air Benefits and Cost and Attainment Assessment, Zhejiang, China, May 20-22 2019;

Coordinator for 2018-2019 AGU Fall Meeting Global Environmental Change section OSPA;

Reviewer board for the journal *Atmosphere* since 2019

Reviewer for 2018 AGU Fall Meeting Berkner Travel Fellowship;

Reviewer for 2018 AGU Fall Meeting David S. Miller Young Scientist Scholarship reviewers;

Reviewer for 2018 AGU Fall Meeting Student Travel Grant;

Reviewer for 2018 July MolSSI Python Data and Scripting Course;

Judge for 2017 AGU Fall Meeting Outstanding Student Paper Award (OSPA);

Judge for 2017 36th AAAR conference Student Poster Competition;

Teachers/Assistant 2012-till now Chapel Hill Bible Church Sunday School;

Mentoring Experiences

- 4) Mentoring 6 M.S. student for the Duke University Master in Interdisciplinary Data Science (MIDS) program as project manager in 2020-2021;
- 3) Mentoring 1 M.S. student from Duke University for carrying the Duke Master Project thesis in 2019-2020 (with 1 research manuscript preparing);
- 2) Mentoring 5 graduate student from UNC-CH for programming, modeling, data visualization and interpolation from 2013-2018;
- 1) Mentoring 3 graduate student from Tsinghua University for IDL programming, GEOS-Chem modeling, data visualization and interpretation from 2010-2011;

Honor and Awards

2020 IOP Publishing *Environmental Research Letter* **Outstanding Reviewer Award for 2019**

2020 EGU Roland Schlich Travel Award

2019 NCAR FASCINATE Workshop Travel Award

2019 AAAS member

2018 “Outstanding Reviewer” for journal *Atmospheric Environment* recognized in June 2018;

2017 Oak Ridge Institute for Science and Education Fellowship (Oak Ridge Associated Universities)

2016 Oak Ridge Institute for Science and Education Fellowship (Oak Ridge Associated Universities)

2015 GPSF Travel Grant

2015 Certificate for *Writing from the Readers’ Perspective* by George Gopen

2014 Koch Travel Award